

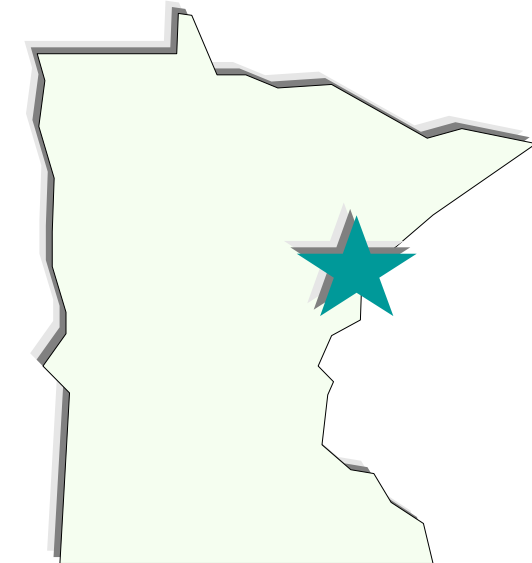
# Duluth Streams: Community partnerships for understanding urban stormwater and water quality issues at the head of the Great Lakes

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## BACKGROUND



### Setting

- 42 named streams; one of the highest densities of stream corridors in any US metro area
- Urban and rural development impact these streams by increasing water volume, temperature, suspended sediments, road salts, organic matter and nutrients

### Partnership

- City, UMD researchers, education and outreach professionals, local resource agencies and other educational institutions

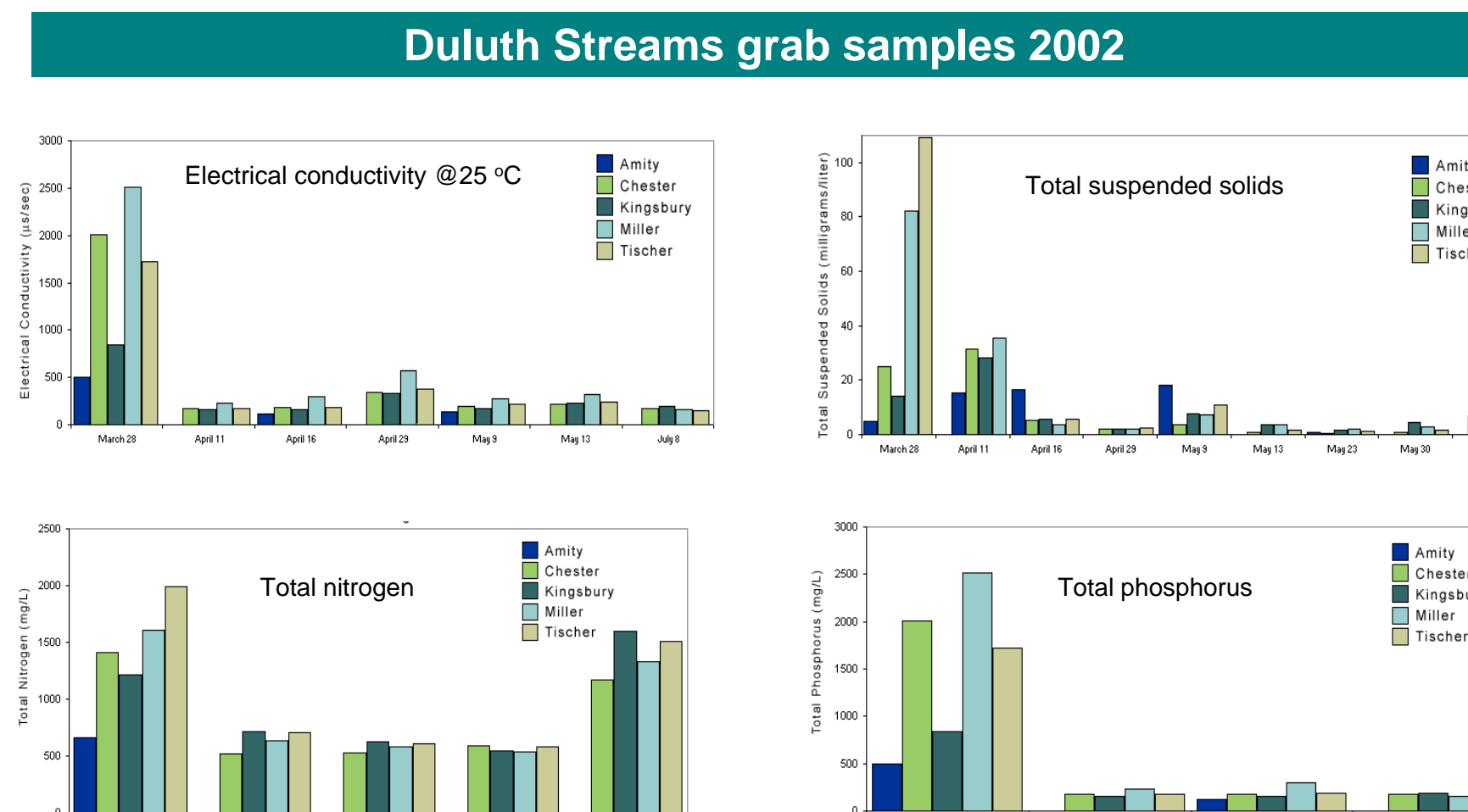
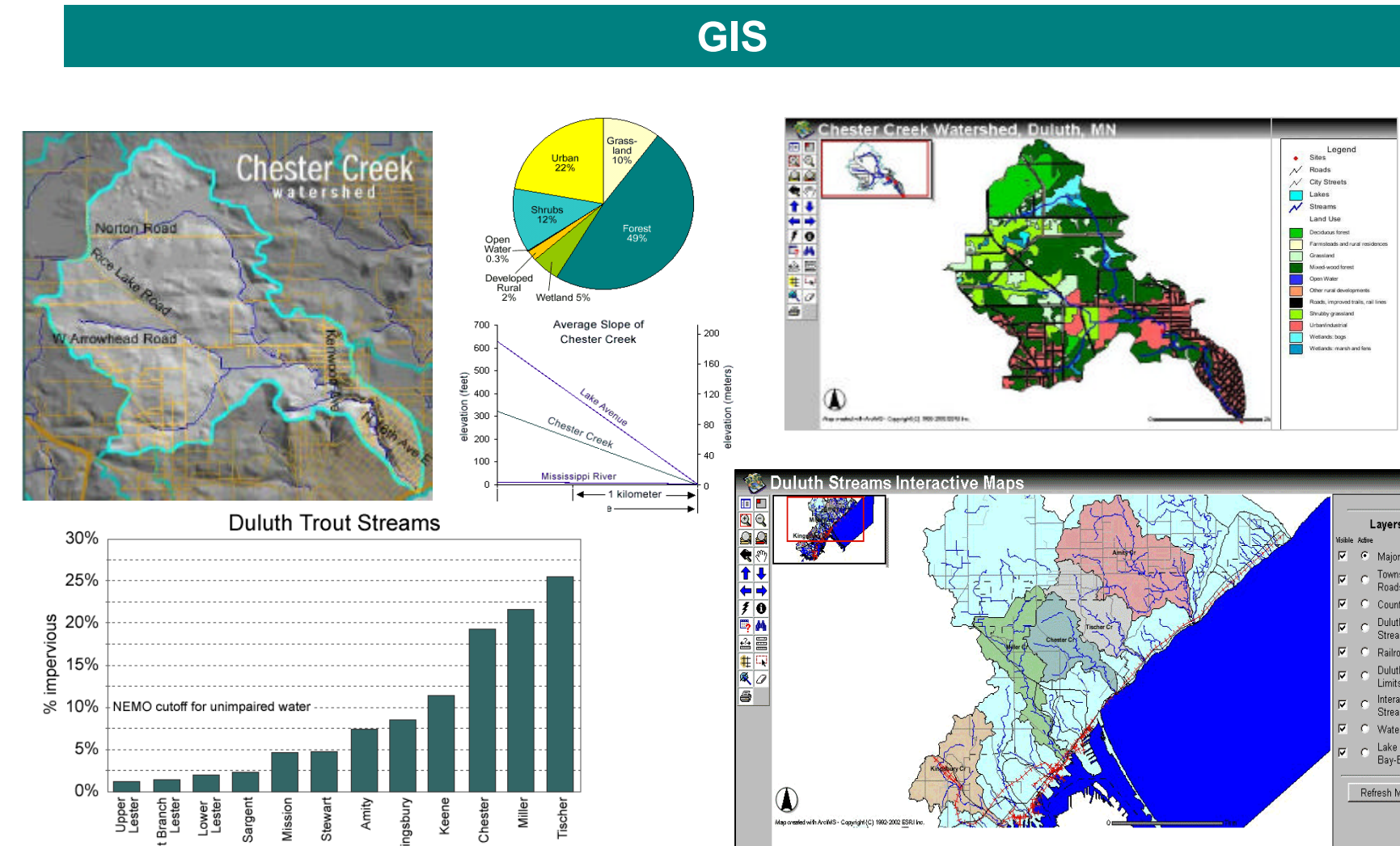
### Chief Goal

- Enhance public understanding of aquatic ecosystems and their connections to watershed land use to provide both economic and environmental sustainability.

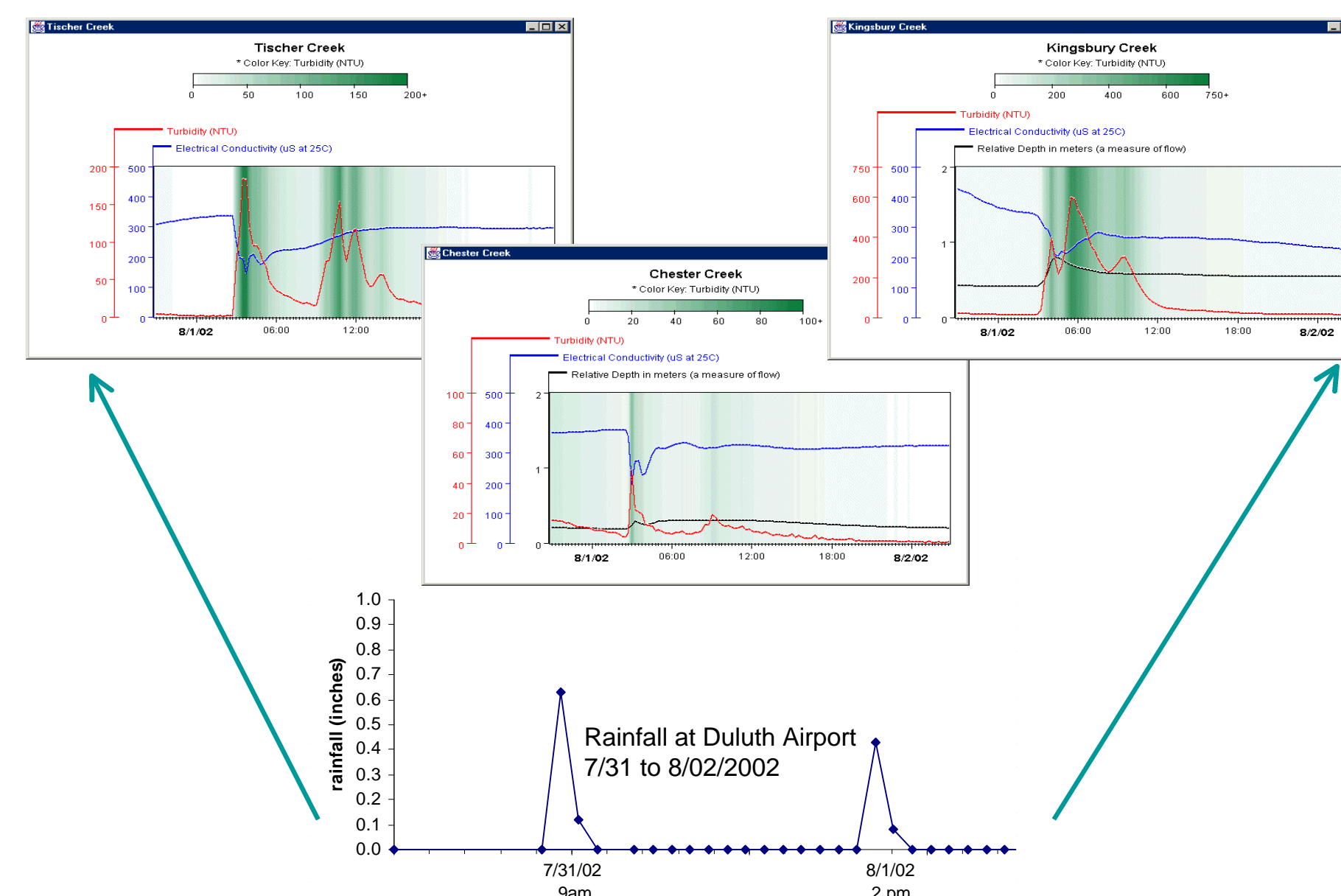
### Objectives

- Link real-time remote water quality sensing in 4 urban streams and GIS technology to current and historic WQ and biological databases using advanced data visualization tools in a website and information kiosks;
- Incorporate visually engaging interpretive text, animations and videos into the website to illustrate the nature and consequences of degraded stormwater and the real costs to society;
- Engage the public in the stormwater issue to facilitate development and implementation of the Duluth Stormwater Management Plan by:
  - Establishing high school stewardship of 3 streams
  - Adapting the Nonpoint Education for Municipal Officials (NEMO) program to the greater Duluth Metropolitan Area
  - Developing high school and college curricula
  - Hosting a Duluth Streams congress as a community forum for presenting all project results

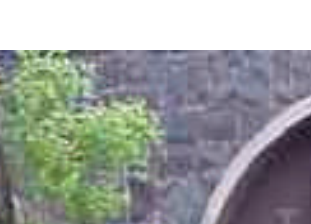
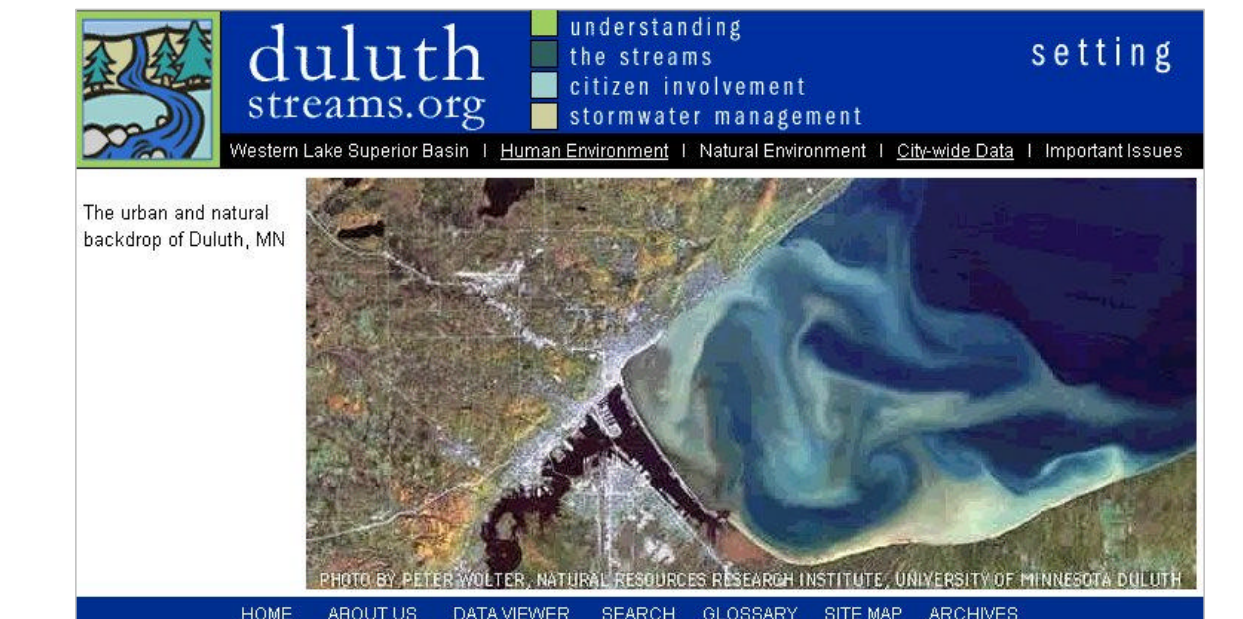
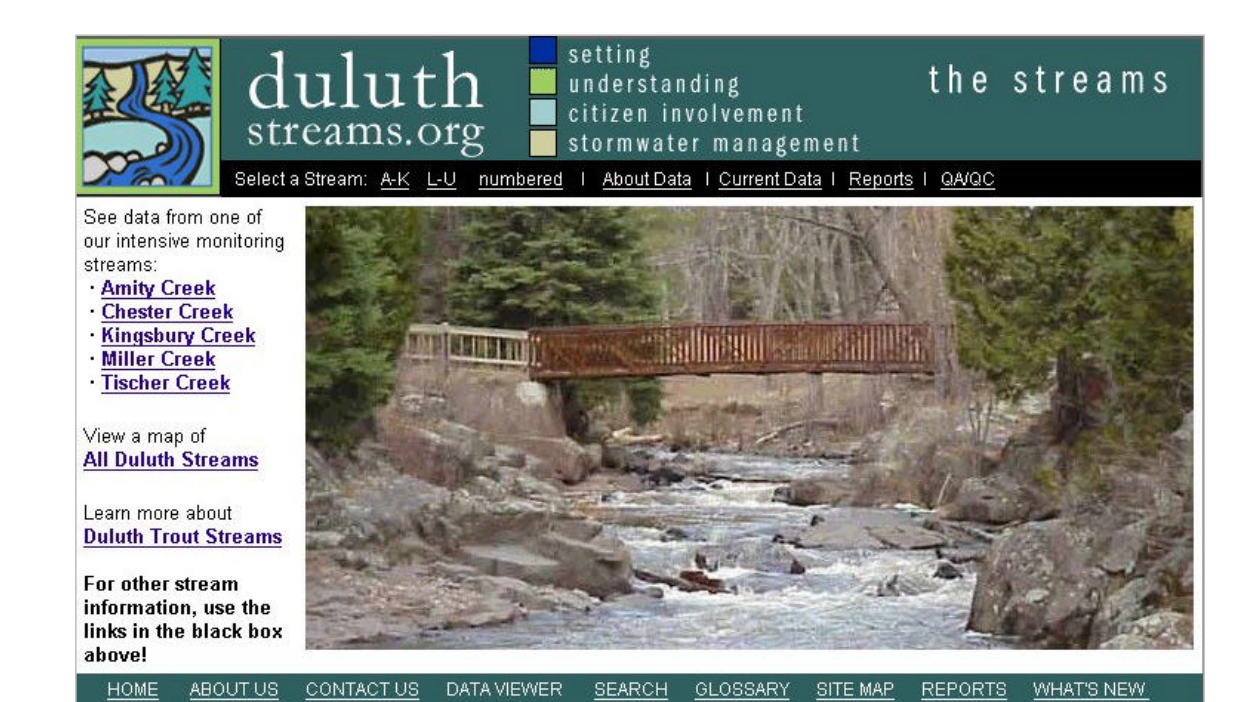
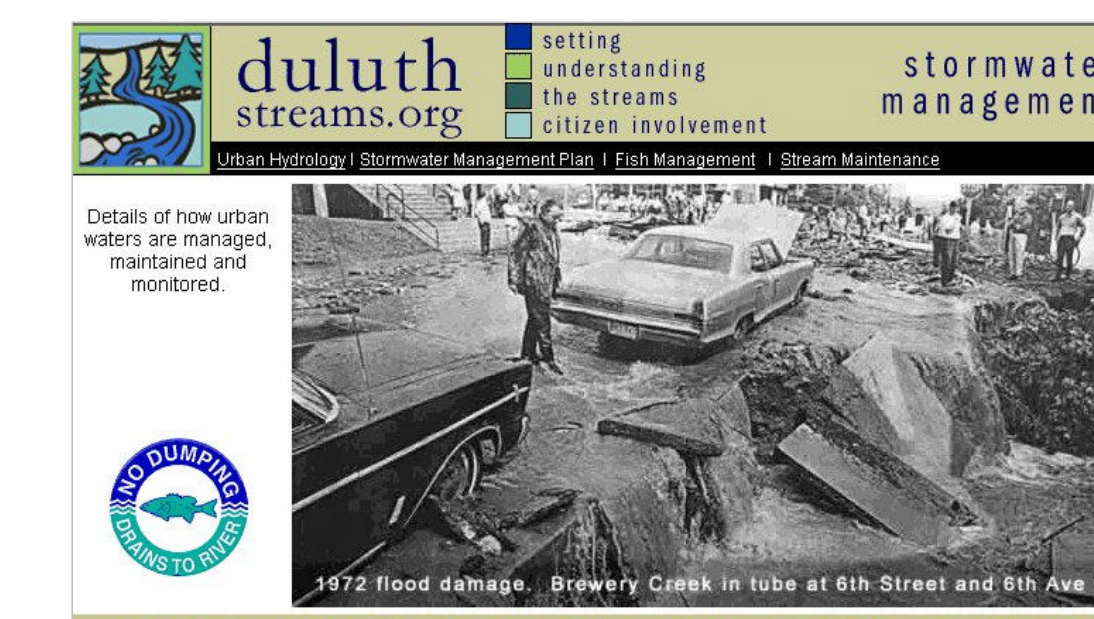
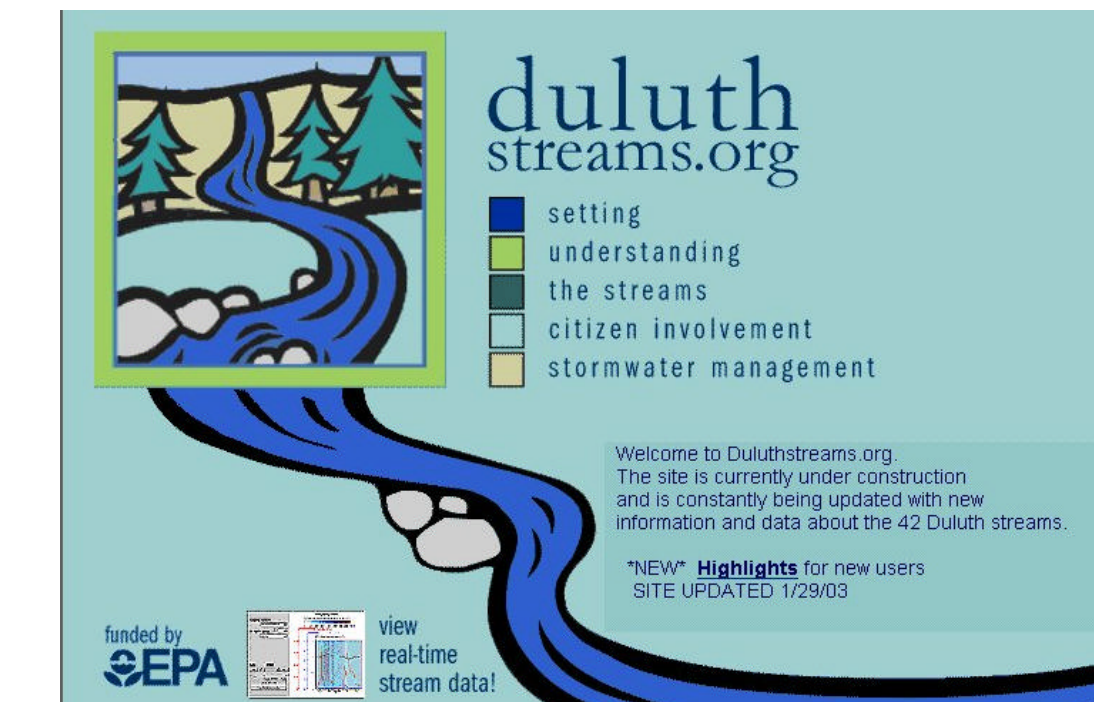
## DATA



### Visualizing a summer storm's effect on stream water quality



## WEBSITE



### Principal investigators, staff and collaborators

- Duluth Utility Operations Stormwater Utility**  
Marion Lonsdale, Jerry Walker, Todd Carlson, Richard Bunton
- NRRI-UMD**  
Rich Axler, George Host, Jerry Henneke, Jane Reed, Elaine Ruzicki, Norm Will, Gerry Sjerven
- MN Sea Grant-UM**  
Carl Richards, Cindy Hagley, Bruce Munson, Jesse Schomberg
- MN Extension Service** – Nate Meyer
- MN Pollution Control Agency** – Jesse Anderson
- Western Lake Superior Sanitary District** – Keith Anderson, Mike Guite
- Lake Superior Zoo** – Mike Janis
- Great Lakes Aquarium**

